



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/517,665

08/05/2005

Shigeo Shirakura

Q85162

1909

23373 7590 12/23/2008
SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

EXAMINER

WEISZ, DAVID G

ART UNIT

PAPER NUMBER

1797

MAIL DATE

DELIVERY MODE

12/23/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/517,665	Applicant(s) SHIRAKURA, SHIGEO	
	Examiner DAVID WEISZ	Art Unit 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 August 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>20041213;20050112;20060330;20080124</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 3 and 7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 3 and 7 disclose the variable "evaluation mole ratio" in the equations of the claims. The arbitrary value is not sufficiently described to enable one of ordinary skill in the art at the time of the invention to utilize the equation of claims 3 and 7 to determine the removal of %NO_x in the disclosed apparatus or method. What is the evaluation mole ratio?

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.

Art Unit: 1797

3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
5. Claims 1-2, 4-6 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keizo et al. (JP747108B2) in view of Yoshimichi et al. (JP1010901A).
6. Regarding claim 1, Keizo discloses an NO_x removal catalyst management unit for use with an NO_x removal apparatus **[0001]**. The management unit is provided for managing a plurality of NO_x removal catalyst layers provided in a flue gas NO_x removal apparatus **[0005]**. The management unit comprises NO_x measurement means for determining NO_x concentrations on the inlet and outlet sides of respective NO_x removal catalyst layers **[0005]**. The management unit also includes NH₃ measurement means for determining NH₃ concentrations on the inlet and outlet sides of the same NO_x removal catalyst layers **[0005]**. However, Keizo does not disclose that the percent NO_x removal determination means for determining percent NO_x removal is on the basis of an inlet mole ratio (i.e., inlet NH₃/inlet NO_x), the inlet mole ratio being derived from an NO_x concentration which is an NO_x concentration as measured on the inlet side by means of said NO_x measurement means and an NH₃ concentration which is an NH₃ concentration as measured on the inlet side by means of said NH₃ measurement means.

Yoshimichi discloses an NO_x catalyst management unit **[0001]** in which a NO_x removal means for determining percent NO_x removal uses the basis of an inlet mole ratio (i.e., inlet NH₃/inlet NO_x) **[0009]**, the inlet mole ratio being

Art Unit: 1797

derived from an NO_x concentration which is an NO_x concentration as measured on the inlet side by means of said NO_x measurement means and an NH₃ concentration which is an NH₃ concentration as measured on the inlet side by means of said NH₃ measurement means **[0011]**. Additionally, Yoshimichi discloses that using the inlet mole ratio allows exhaust gas calculations to be calculated using a predetermined function **[0012]**.

Keizo and Yoshimichi are analogous because both references are directed towards using NH₃ concentrations to determine NO_x removal in a catalyst.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the mole ratio disclosed by Yoshimichi in the NO_x catalyst management unit of Keizo because having a predetermined function would allow for NO_x removal efficiency calculation.

Regarding claim 2, modified Keizo discloses all of the claim limitations as set forth above. Additionally, the reference discloses the NO_x removal catalyst management unit for use with an NO_x removal apparatus, wherein the percent NO_x removal is determined on the basis of NH₃ concentrations (**Yoshimichi [0012]**).

Regarding claim 4, modified Keizo discloses all of the claim limitations as set forth above. Additionally, the reference discloses the NO_x removal catalyst management unit for use with an NO_x removal apparatus, which management unit further includes transmission means for transmitting concentration values (**Yoshimichi [0017-0018]**) determined by the NO_x measurement means and the

Art Unit: 1797

NH₃ measurement means to the percent NO_x removal determination means **(Keizo [0005])**, wherein the percent NO_x removal determination means determines the percent NO_x removal of respective NO_x removal catalyst layers included in a plurality of flue gas NO_x removal apparatuses **(Keizo [0005])**.

Regarding claim 5, modified Keizo discloses all of the claim limitations as set forth above. Additionally, the reference discloses a method for managing an NO_x removal catalyst for use with an NO_x removal apparatus **(Keizo [0001])**, the method being provided for managing a plurality of NO_x removal catalyst layers provided in a flue gas NO_x removal apparatus **(Keizo [0005])**, characterized in that the method comprises determining NO_x concentrations and NH₃ concentrations on the inlet and outlet sides of respective NO_x removal catalyst layers **(Keizo [0005])**; determining percent NO_x removal on the basis of an inlet mole ratio (i.e., inlet NH₃/inlet NO_x) **(Yoshimichi [0009])**; and evaluating performance of respective NO_x removal catalyst layers on the basis of the percent NO_x removal **(Keizo [0005])**, the inlet mole ratio being derived from an NO_x concentration which is an NO_x concentration as measured on the inlet side and an NH₃ concentration which is an NH₃ concentration as measured on the inlet side **(Yoshimichi [0009])**.

Regarding claim 6, modified Keizo discloses all of the claim limitations as set forth above. Additionally, the reference discloses the method for managing an NO_x removal catalyst for use with an NO_x removal apparatus, wherein the percent NO_x removal is determined on the basis of NH₃ concentrations **(Yoshimichi [0012])**.

Regarding claim 10, modified Keizo discloses all of the claim limitations as set forth above. Additionally, the reference discloses the method for managing an NOx removal catalyst for use with an NOx removal apparatus, wherein the method further comprises determining the percent NOx removal of respective NOx removal catalyst layers included in a plurality of flue gas NOx removal apparatuses (**Keizo [0005]**) and evaluating catalytic performance of respective NOx removal catalyst layers included in a plurality of flue gas NOx removal apparatuses (**Keizo [0005]**).

7. Claims 8-9 and 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Keizo et al. (JP747108B2) in view of Yoshimichi et al. (JP1010901A) as applied to claims 1-2, 4-6 and 10 above, and further in view of Ganeshan (US 2002/0127153).

Regarding claim 8, modified Keizo discloses all of the claim limitations as set forth above. However, the reference does not disclose that the method further comprises performing restoration treatment of an NOx removal catalyst layer having a catalytic performance deteriorated to a predetermined level, on the basis of results of performance evaluation of the respective NOx removal catalyst layers.

Ganeshan discloses a method for managing an NOx removal catalyst for use with an NOx removal apparatus **[0008-0010]**, including performing restoration treatment of an NOx removal catalyst layer having a catalytic performance deteriorated to a predetermined level. The restoration is performed on the basis of results of performance evaluation of the respective NOx removal

Art Unit: 1797

catalyst layers **[0020]**. Additionally, Ganeshan discloses that replacing the catalyst uses conventional methodology and equipment **[0020]**.

Ganeshan and modified Keizo are analogous because all references are directed toward selective catalytic reduction units and the management of NO_x.

It would have been obvious to one having ordinary skill in the art at the time of the invention to use the catalyst layer restoration treatment of Ganeshan in the method of managing an NO_x removal catalyst for use with an NO_x removal apparatus of modified Keizo because it is conventional to replace the catalyst when it does not sufficiently reduce NO_x.

Regarding claim 9, modified Keizo discloses all of the claim limitations as set forth above. Additionally, the reference discloses the method for managing an NO_x removal catalyst for use with an NO_x removal apparatus, wherein the performance restoration treatment is replacement of the NO_x removal catalyst layer with a new NO_x removal catalyst layer (**Ganeshan [0020]**).

Regarding claims 11 and 12, modified Keizo discloses all of the claim limitations as set forth above. Additionally, the reference discloses the method for managing an NO_x removal catalyst for use with an NO_x removal apparatus, wherein the method further comprises determining the percent NO_x removal of respective NO_x removal catalyst layers included in a plurality of flue gas NO_x removal apparatuses (**Keizo [0005]**) and evaluating catalytic performance of respective NO_x removal catalyst layers included in a plurality of flue gas NO_x removal apparatuses (**Keizo [0005]**).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID WEISZ whose telephone number is (571)270-7073. The examiner can normally be reached on Monday - Thursday, 7:30 a.m. - 5:00 p.m., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden can be reached on (571)-272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. W./
Examiner, Art Unit 1797

/Jill Warden/
Supervisory Patent Examiner, Art Unit 1797